UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8960

NOV - 2 2010

Colonel Keith A. Landry
District Engineer
Louisville District Corps of Engineers
Attn: Todd Hagman (Regulatory Branch)
OP-FN, Room 752
P.O. Box 59
Louisville, Kentucky 40201-0059

Subject: Premier Elkhorn Coal Company, Little Fork Surface Mine
U.S. Army Corps of Engineers LRL-2007-0594
Kentucky Division of Mine Permits #898-0800

Dear Colonel Landry:

The U.S. Environmental Protection Agency (EPA), Region 4, has reviewed the information submitted by or on behalf of the Premier Elkhorn Coal Company for impacts to jurisdictional waters of the U.S. as a result of proposed surface coal mining activities associated with its Little Fork Surface Mine in Pike County, Kentucky (LRL-2007-0594; #898-0800). Our review has included the original April 24, 2007, U.S. Army Corps of Engineers (Corps) Clean Water Act (CWA) Section 404 permit application as well as several additional documents provided by or on behalf of the permit applicant. EPA is concerned that the permit, as proposed, is not consistent with requirements of the agencies' regulations, including the Section 404(b)(1) Guidelines, and therefore recommends that changes to the project identified in this letter be incorporated before authorization is provided. EPA is also recommending that an Environmental Impact Statement should be prepared for this permit to assess potential environmental impacts under the National Environmental Policy Act.

The applicant originally sought authorization to impact 6,845 linear feet (lf) of ephemeral and intermittent streams to facilitate construction of six hollow fills and four in-stream sediment ponds in unnamed jurisdictional tributaries to Little Fork, Robinson Creek, and Indian Creek. Little Fork discharges into Robinson Creek, and both Robinson Creek and Indian Creek discharge directly into Shelby Creek in the Levisa Fork watershed. Subsequently, the applicant revised the mine plan and presently proposes five hollow fills and three in-stream sediment control ponds. Anticipated impacts to jurisdictional waters now comprise 5,560 lf of ephemeral and intermittent streams, including 4,415 lf as a result of the hollow fills and 1,145 lf as a result of sediment control ponds and a "drainage corridor" between the toe of HF#3 and Pond#3.

EPA has been coordinating closely with your staff and the permit applicant since the 60-day ECP review period began on August 19, 2010, (including a 15-day extension of the review period). On September 30, 2010, EPA submitted a comment letter to the Corps providing additional detail on our informal comments of August 20, 2010, and requesting a meeting with

the Corps and the applicant to initiate efforts to resolve these concerns. EPA and the Corps subsequently held a conference call on October 6, 2010, to discuss EPA's letter and outline a path towards resolution of the concerns described therein. On October 14, 2010, EPA, the Corps, and the applicant held the first of numerous conference calls to discuss additional information requirements and opportunities to resolve ongoing concerns with the proposed project.

EPA is appreciative of the applicant's efforts during this process, which have included compilation and submittal of additional information substantiating the position that use of the adjacent reclaimed impoundment to store spoil material is not a practicable alternative for the proposed Little Fork Surface Mine. The applicant has also agreed to implement best management practices (BMP's) to minimize erosion and sedimentation from disturbed areas, retain existing vegetation to the maximum extent practicable, and take efforts to first identify and then isolate the most highly reactive spoil material likely to generate excessive total dissolved solids (TDS) and contribute to elevated specific conductivity (SC). Additionally, the applicant has agreed to amend its mitigation plan to add payment of an in-lieu-fee (ILF) to the Kentucky Department of Fish and Wildlife Resources Wetland and Stream Mitigation Program for authorized impacts to jurisdictional streams adversely affected due to construction of in-stream sediment ponds. Previously, the applicant had proposed an ILF payment for proposed permanent impacts, but planned to mitigate for sediment pond impacts simply via removal of the ponds and restoration of affected streams many years following the impacts themselves.

Despite the changes described above, EPA has significant remaining environmental concerns regarding this project as currently proposed. EPA's review is intended to ensure that the proposed project meets the requirements of the CWA. The CWA Section 404(b)(l) Guidelines promulgated in regulations by EPA in conjunction with the Secretary of the Army establish the substantive environmental standards applied in the review of projects proposing to discharge dredged or fill material into waters of the United States. The Guidelines establish a sequence of review requiring: (1) an evaluation of practicable alternatives that meet the project's basic purpose to ensure selection of the least environmentally damaging practicable alternative so long as that alternative will not result in significant environmental degradation); (2) taking all appropriate and practicable steps to minimize potential adverse impacts; and (3) compensation for all remaining unavoidable impacts to waters of the United States. In addition, the Guidelines require that no discharge may be permitted that would cause or contribute to significant degradation of the waters of the United States.

Scientific literature has increasingly recognized the relationship between discharges from surface coal mining operations and downstream water quality impairments. A 2005 published study, "Evaluation of Ionic Contribution to the Toxicity of a Coal-Mine Effluent Using *Ceriodaphnia dubia*" by Kennedy, et al. linked impairment of aquatic life to TDS levels. EPA also notes that in previous technical reports, the Commonwealth of Kentucky has recognized the potential detriment to stream biota in headwater streams in the Eastern Kentucky Coal Field correlated with specific conductivity levels above 400 µS/cm (Pond and McMurray, 2002[1]). A

[1] Pond, G.J. and S.E. McMurray. 2002. A Macroinvertebrate Bioassessment Index for Headwater Streams of the Eastern Kentucky Coalfield Region, Kentucky. Kentucky Department for Environmental Protection, Division of Water. Frankfort, KY.

2008 published study, "Downstream effects of mountaintop coal mining: comparing biological conditions using family- and genus-level macroinvertebrate bioassessment tools," by Pond, et al. found evidence indicating that mining activities have subtle to severe impacts on aquatic life and the biological conditions of a stream. A 2010 published study by Pond, "Patterns of *Ephemeroptera* taxa loss in Appalachian headwater streams (Kentucky, USA)," links conductivity as the most strongly correlated factor to *Ephemeroptera* abundance in streams impacted by mining and residential development. A draft report by EPA, "The Effects of Mountaintop Mines and Valley Fills on Aquatic Ecosystems of the Central Appalachian Coalfields," recognizes that surface coal mining causes effects that include resource loss, water quality impairment, and adverse effects on aquatic resources. Finally, another draft report by EPA, "A Field-based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams" recognizes stream-life impacts associated with elevated levels of conductivity.

As part of its permit application, the applicant collected water quality data from project streams in March 2007 and reported specific conductivity values ranging from 469 to 1,777 µS/cm. EPA collected similar data in February 2010 and found specific conductivity in these same streams to range from 57 to 988 µS/cm. In addition, EPA documented specific conductivity in receiving waters downstream of the surface mine site itself ranging from 497 to1,008 µS/cm (e.g. Little Fork, Robinson Creek, and Indian Creek). EPA further notes that Indian Creek, which is the receiving water body for 6 of the applicant's 37 proposed National Pollutant Discharge Elimination System (NPDES) outfalls, is on the KY 2006, 2008, and draft 2010 CWA 303(d) list (partially supporting warm water aquatic habitat) for sedimentation/siltation and TDS.

EPA believes that additional improvements must be made to the proposed mine's design, management practices, and monitoring plan in order to ensure compliance with the 404(b)(1) Guidelines. These improvements are designed to yield an overall improvement in the condition of the watershed, which has been significantly impacted by historic mining activities. EPA believes that the following conditions should be incorporated into any final authorization under Section 404 in order to ensure that the discharges will not cause or contribute to a violation of State water quality standards (WQS), or cause or contribute to significant degradation of waters of the United States consistent with the Guidelines (40 C.F.R. § 230.10(b) and (c)).

Fill Sequencing and Best Management Practices

EPA recommends that the proposed hollow fills be constructed sequentially (one at a time) with sufficient time between the construction of subsequent fills for water quality monitoring to demonstrate that the discharge of fill material does not result in adverse impacts to the downstream aquatic ecosystem. While the applicant has provided some information to suggest that construction of fills in a sequenced approach would not be feasible, the information provided to EPA has not demonstrated that this approach is not practicable. More importantly, we are concerned that without sequencing and associated monitoring, the project may result in the violation of water quality standards and cause significant degradation of stream functions and biodiversity. The applicant should be required to submit a practicability analysis of alternatives involving a sequenced approach for valley fill construction – including individual fill construction and construction of valley fills in two or three phases – before the proposed project is authorized.

EPA believes that if water quality or biological monitoring downstream of one "sequenced" valley fill demonstrates adverse impacts to the downstream aquatic ecosystem – as determined by exceedances of specific numeric thresholds – the permit should trigger implementation of an adaptive water quality management plan (AMP) prior to construction of the next hollow fill, as described in the enclosed special permit condition (see Enclosure 1). Construction of the next hollow fill would not be authorized if the monthly flow-weighted specific conductivity measured at the representative outfall downstream of the first hollow fill exceeds the applicable water quality criteria for more than one consecutive month, or if the overall trend in conductivity levels are increasing such that the linear trend demonstrates likely future exceedance of such criteria.[2] To support this demonstration, supplemental monitoring requirements, including both chemical and biological monitoring parameters, should also be included as special conditions.

EPA believes that several demonstrated BMPs and fill construction practices for surface coal mining operations have the potential to reduce existing downstream levels of conductivity and TDS. These practices include efforts to identify and then isolate TDS- or sulfate-producing materials to minimize the likelihood that these materials will come into contact with groundwater or precipitation and therefore impact downstream waters. The proper implementation of similar BMPs has been shown to reduce specific conductance in streams draining a Magoffin County, Kentucky surface coal mine by as much as 75 percent over elevated background conditions in re-mined valleys.

EPA is appreciative of the applicant's recent endorsement of measures to identify and isolate TDS and/or sulfate producing materials in the field, as memorialized in their November 1, 2010, list of revised BMP's. EPA recommends that these measures be included as special conditions into any final authorization under Section 404 for disposal of dredged or fill material into waters of the U.S. for the Little Fork Surface Mine. These special conditions should include, at a minimum, the following:

- Identification via field-based testing of TDS and/or sulfate-producing materials that must then be isolated;
- Implementation of hollow fill design alternatives that reduce infiltration (e.g. compact surface lifts, crown the fill surface) and controls flow through the fill to avoid contact time between water and reactive materials (i.e. TDS and/or sulfate producing geologic strata); and
- Use of only low-reactive or non-reactive durable rock to construct underdrains and place only these same materials adjacent to the sides of the highwalls and hollow fills.

EPA notes that the BMPs described above relate directly to fill activities in waters of the United States that are likely to have impacts on downstream water quality. The Section 404

[2] With respect to conductivity, EPA would be satisfied with using 500 µS/cm as an numeric interpretation of the narrative standards relevant here. This value represents best-available scientific information on the relationship between conductivity levels and aquatic life in central Appalachian streams, as described in the scientific literature described earlier in this letter.

regulations establish a requirement at 40 C.F.R. 230(10)(b) that no permit may be issued that would cause or contribute to a violation of WQS. This requirement must be met regardless of whether actions necessary to meet this provision would trigger changes to permits issued under other Federal or State regulatory programs.

Adaptive Management Plan (AMP)

EPA believes that special conditions should include an AMP – described above – based on robust water quality and biological monitoring to identify trends in these parameters and to define specific thresholds of concern. If such thresholds are reached, the AMP would require specific response actions. EPA also believes the AMP should include a phased approach, such that increased impacts to downstream waters would trigger increased remedial actions until such time as water quality goals are met.

Existing scientific literature has demonstrated a strong relationship between elevated levels of specific conductance, surface coal mining activities, and degradation of aquatic communities. Therefore, EPA believes that levels of SC should be included as trigger points within the AMP. Recognizing that conductivity levels in on-site streams are already elevated, and anticipating that specific conductance in affected streams will experience at least a short-term increase during land clearing, initial excavation, and hollow fill construction, the trigger for development of the AMP will be applicable only after the initial six (6) months following the discharge of dredged or fill material into waters of the U.S. (I.4(v)). This initial 6-month period would require notification to both the Corps and EPA if monitoring indicates that the trend in monthly flow-weighted conductivity, defined in Special Condition I.4(iii), will exceed background levels or an acceptable numeric interpretation of the applicable narrative water quality standards[3], whichever is greater. Background conditions should be defined as the lesser of values measured in the field in March 2007 and February 2010 (Table 1).

If, however, during any 3 consecutive months during the subsequent 12 months of monitoring, the trend defined at proposed Special Condition I.4(iii) indicates that the monthly flow-weighted conductivity values will not likely fall below levels incompatible with meeting applicable water quality standards, or if any 3 consecutive monthly flow-weighted conductivity values exceed such levels,[4] then the permittee will conduct an analysis of the sources of effluent conductivity and develop Phase I of the AMP to reduce effluent conductivity (measured as specific conductivity) and TDS (see Enclosures 1 and 2). This AMP, to be developed by the applicant and approved by the Corps, should be based on the most technologically advanced and effective approaches available, and assumes that efforts to identify and isolate TDS- and sulfate-producing geologic strata are implemented as part of mine design and hollow fill construction, as outlined above.

If water quality goals are not met after an additional six months of implementation of the AMP, then Phase II of the AMP will be initiated. This plan will also be developed by the applicant and approved by the Corps. If Phase II of the AMP also fails to result in water quality conditions consistent with the goals outlined herein, it is EPA's recommendation that the applicant be

[3] See, supra, footnote 2.
[4] See, supra, footnote 2.

required by the permit special conditions to provide additional compensatory mitigation, either on-site or within the 12-digit hydrologic unit code (HUC) sub-watershed, aimed at addressing adverse chemical water quality conditions.

Table 1. Background specific conductivity in project streams.

Station I.D.	Station Location	Date	Investigator	Specific Conductivity (uS/cm)	BACKGROUND CONDITIONS [1]
UT Little Fork	HF#1	March 2007	Applicant	638	638
ROB02	UT HF#1	Feb 2010	EPA R4	769	
UT Little Robinson Crk	HF#3	March 2007	Applicant	1777	988
ROB07	UT HF#3	Feb 2010	EPA R4	988	
UT Little Robinson Crk	HF#4	March 2007	Applicant	785	785 [2]
ROB09	UT HF#4	Feb 2010	EPA R4	57 [2]	
UT Indian Crk	Pond#21 (HF#5/6)	March 2007	Applicant	469	191 [3]
UT Indian Crk	HF#5	March 2007	Applicant	681	
UT Indian Crk	HF#6	March 2007	Applicant	681	
ROB12	UT HF#5/6	Feb 2010	EPA R4	191	

[1] Background specific conductivity is determined as the lesser of *in-situ* specific conductivity measured by the permit applicant in March 2007 and by EPA Region 4 in February 2010.

[2] Field conditions at HF#4 in February 2010 were not representative of hydrologic conditions required to form the channel present in this valley. As a result, data collected in this valley in February 2010 is considered anomalous.

[3] HF#5 and HF#6 are proposed to be built in two forks of a single valley. The toe of each of these proposed fills will lie approximately 140 feet apart, effectively rendering them a single large fill. The two fills will share a single sediment pond (Pond #21), and it is the specific conductivity measured in the field at the proposed location of this pond that will be considered background conditions in this valley.

In addition to concerns regarding conductivity levels directly downstream of proposed valley fills, EPA remains concerned about the overall cumulative impacts of the proposed Little Fork Surface Mine on an already degraded watershed. Therefore, EPA believes the AMP should require monitoring of conductivity levels downstream of the proposed operation in Robinson Creek and Indian Creek. Despite currently elevated conductivity levels in streams adjacent to the project site, as described above, EPA has reason to believe that several streams in the project area currently contribute freshwater dilution to downstream waters. Increasing conductivity levels in these streams, therefore, could make conditions in an already impaired watershed worse.

Therefore, the AMP should require monitoring downstream of the project in Indian Creek and Robinson Creek to ensure that baseline conductivity levels are not exceeded. If monitoring demonstrates increased levels of conductivity in these receiving streams that are attributable or likely attributable to the proposed project, the applicant should be required to implement corrective actions within the watershed to ensure that conductivity levels do not exceed pre-

mining levels. Such opportunities may include remediation of previously mined areas within the watershed, implementing additional BMPs within the project site, or additional contributions to the Kentucky ILF program for projects undertaken within the watershed. Without imposing such a condition in the AMP, EPA is concerned that the project has the potential to cause or contribute to violations of downstream WQS and continuing impairment of downstream waters.

Water Quality

The proposed project would impact more than 1 mile of streams, including the permanent loss of 4,415 lf of streams located in the Robinson Creek and Indian Creek watersheds. Both Robinson Creek and Indian Creek discharge directly into Shelby Creek in the Levisa Fork watershed. Based on our preliminary review of the available water quality data, we believe that the proposed project may cause or contribute to exceedances of WQS in streams that are already known or suspected to be impacted by mining-related (and other) causes. Furthermore, the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit previously issued for this project does not set numeric limits for parameters of concern, such as conductivity, which scientific literature has demonstrated have significant effects on downstream biological communities.

EPA notes that Indian Creek is the receiving water body for 6 of the applicant's 37 NPDES outfalls for this project (authorized under a Kentucky NPDES General Permit, KPDES No. KYG046229). Additionally, nine outfalls discharge to unnamed tributaries of Indian Creek. Indian Creek is on the Kentucky 2006, 2008, and draft 2010 CWA§303(d) lists (partially supporting warm water aquatic habitat) for sedimentation/siltation and TDS. The CWA§303(d) list shows one of the suspected sources of the impairment in Indian Creek to be surface mining. The KPDES General Permit under which the project initially received coverage has expired and has been replaced by the most recent KPDES General Permit to Discharge Treated Wastewater into Waters of the Commonwealth applicable for coal mining (KYG040000; July 1, 2009).

The 2009 KPDES General Permit under which this project is (apparently) covered expressly excludes from coverage operations discharging directly to waters that are listed for coal-mining related pollutants. Such pollutants are defined to include sedimentation, total suspended solids, TDS, conductivity, iron, manganese, and metals. This project will discharge directly to waters that are listed as impaired due to TDS and sedimentation. Therefore, EPA believes that general permit for these outfalls is inappropriate and therefore the Section 402 permit as written does not protect WQS.

The 404(b)(1) Guidelines prohibit permitting a discharge of dredged or fill material if such discharge would cause or contribute to violations of any applicable WQS. In light of this provision, EPA believes that no Section 404 permit should be issued that would authorize discharges to Indian Creek or its tributaries until these inconsistencies are resolved. Alternatively, if the Corps determines that issuing a permit associated with discharges to these streams is appropriate, then the permit should include limits for specific conductance that are protective of water quality. These limits should be based on the conclusions of the scientific studies described above, which reflect best-available scientific information.

National Environmental Policy Act / Environmental Justice

Based on our review of the information available, including a Cumulative Impact Assessment (CIA) for the Upper Levisa, EPA believes it may be appropriate for the Corps to prepare an Environmental Impact Statement (EIS) concerning this proposed project. In making the determination regarding the need to prepare an EIS, we recommend that you consider the relatively large scale of the impacts associated with proposed project, e.g., the loss of over 4,400 lf of stream and the construction of 5 valley fills, as well as questions concerning how effective the proposed mitigation will be at reducing the severity of the potential direct, indirect, and cumulative impacts. In that light, EPA is uncertain that the current mitigation proposal would serve as a basis to support a Finding of No Significant Impact. With regard to the CIA, we are particularly concerned that the geographic boundary (HUC-8) may be too large spatially to provide a meaningful analysis of impacts from mining in the affected watershed. In addition, we are concerned that the CIA does not address potential cumulative human health impacts, and that the CIA presents several instances of incomplete information.

Consistent with Executive Order 12898 entitled "Federal Actions to Address Environmental Justice In Minority Populations and Low-income Populations" and the accompanying Presidential Memorandum, EPA recommends that the Corps' Section 404(b)(1) Guidelines and NEPA reviews analyze the potential for disproportionately high and adverse effects on low-income or minority populations in the area. Specifically, a characterization of the economic status of residents near the site and the conditions they face including any effects relating to the proximity of the blasting zone, locations of discharges of fill material, truck traffic, noise, fugitive dust, and habitat loss needs to be conducted to adequately assess the potential impact to EJ communities. Additional information is also needed concerning sources of drinking water for the affected populations (including municipal water supplies and private sources of drinking water including streams and/or wells). EPA also recommends that you take steps to ensure meaningful engagement of affected communities.

Conclusion

While EPA appreciates the applicant's willingness to discuss the adoption of certain BMP's into their mine plan, we believe that the Corps should incorporate further required special conditions before issuing any final authorization. Without including such conditions, EPA believes the proposed project is inconsistent with the 404(b)(1) Guidelines and will likely cause violations of WQS and associated significant degradation of stream life. EPA's recommended special conditions are outlined above, and detailed in the enclosed document. EPA also requests that we have the opportunity to review and comment on the draft permit and special conditions prior to finalization.

I want to thank you and your staff for your cooperation and willingness to address our issues. We look forward to continue working closely with you and the applicant as the permit is finalized. If you have any questions, please call me at (404) 562-9470 or Eric Somerville of my staff at (706) 355-8514.

Sincerely,

Gail Mitchell, for

James D. Giattina
Director
Water Protection Division

Enclosures

cc: Jim Townsend, Louisville District, Louisville, KY
Lee Anne Devine, Louisville District, Louisville, KY
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Enclosure 1
Proposed Clean Water Act Section 404 Permit Special Conditions

I. Best Management Practices & Adaptive Management Plan

1. The permittee shall submit a detailed plan to the U.S. Army Corps of Engineers (Corps) Louisville District and the U.S. Environmental Protection Agency, Region 4 (EPA) for implementing mine design and hollow fill construction alternatives and best management practices (BMPs) to minimize TDS and specific conductivity during the placement of fill material into waters of the United States (U.S.) during the construction of the hollow fills. The objective of these procedures is to ensure that effluent discharging from the mine does not have a monthly flow-weighted specific conductivity greater than that which would violate applicable water quality standards,[1] consistent with best-available science on the relationship between conductivity and aquatic life. This plan must be approved by the Corps, and transmitted to EPA, prior to discharge of any dredged or fill material into any water of the U.S. Proposed actions should include, but are not necessarily limited to:

    - Identification via field-based testing of TDS and/or sulfate producing materials that must then be isolated;
    - Implementation of hollow fill design alternatives that reduce infiltration (e.g. compact surface lifts, crown the fill surface) and controls flow through the fill to avoid contact time between water and reactive materials (i.e. TDS and/or sulfate producing geologic strata);
    - Use of only low-reactive or non-reactive durable rock to construct underdrains and place only these same materials adjacent to the sides of the highwalls and hollow fills.

2. The permittee shall construct hollow fills individually, one at a time, with an adequate monitoring period between completion of one fill to demonstrate water quality is protected. Construction of the next hollow fill would not be authorized if the monthly flow-weighted specific conductivity measured at the representative outfall downstream of the first hollow fill exceeds levels consistent with applicable water quality standards for more than one consecutive month, or if the overall trend in conductivity levels are increasing such that the linear trend demonstrates likely future exceedance of such levels.[2]

3. The permittee shall submit documentation to the Corps and EPA indicating all BMPs employed in each hollow fill within 30 days of site preparation and commencement of construction of the rock underdrain.

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[1] See, supra, footnote 2.
[2] See, supra, footnote 2.

4. (i) The permittee must submit monthly flow-weighted conductivity, $\overline{K}$, to the Corps and EPA for the effluent of Pond#1, Pond#3, Pond#15, and Pond#21 following the commencement of discharges of fill material into waters of the U.S. using data collected as part of the applicable Kentucky NPDES permit, augmented as necessary to meet the special condition requirement below. Monthly flow-weighted conductivity shall be calculated as follows:

$$\overline{K} = \frac{\sum_i (Q_i \times K_i)}{\sum_i Q_i}$$

where:

$\overline{K}$ = monthly flow-weighted conductivity, µS/cm
Qi = flow for the i^{th} sample per month, cfs
K_i = conductivity for the i^{th} sample per month, µS/cm.

(ii) Specific conductivity will be measured no less frequently than two (2) times per month following the initial discharge of dredged or fill material into waters of the U.S. in each valley where such discharges occur through final bond release.

(iii) The monthly flow-weighted conductivity, $\overline{K}$, will be plotted as a time series and the trend in effluent conductivity calculated by linear regression. If the trend indicates that the monthly flow-weighted conductivity will exceed background levels, as defined below, or another acceptable numeric interpretation compatible with applicable narrative water quality standards,[3] whichever is greater, during the first six months following the initial discharge of dredged or fill material into any water of the U.S., the applicant will promptly notify both the Corps and EPA. All data will be provided to both the Corps and EPA within 15 days of the final monthly measurement used to calculate flow-weighted conductivity.

(iv) Background specific conductivity levels are defined as the lesser value recorded *in-situ* by the permit applicant in March 2007 and EPA in February 2010, except at HF#4 where anomalous conditions in February 2010 affected data integrity:

Tributary draining HF#1:	638 µS/cm
Tributary draining HF#3:	988 µS/cm
Tributary draining HF#4:	785 µS/cm
Tributary draining HF#5/6:	191 µS/cm

(v) If during any three (3) consecutive months during the subsequent twelve (12) months following the monitoring period outlined in I.4(iii), the trend defined therein indicates that the monthly flow-weighted conductivity values will not

[3] See, supra, footnote 2.

likely be less than necessary to satisfy applicable water quality standards by the end of this 12-month monitoring period, or if any three (3) consecutive monthly flow-weighted conductivity values exceed such levels,[4] then the permittee will conduct an analysis of the sources of effluent conductivity and develop an adaptive management plan (AMP) Phase I to reduce effluent conductivity (measured as specific conductivity) and TDS.

(vi) The conductivity trend analysis and adaptive management plan shall be submitted to the Corps for approval, and transmitted to EPA, within 30 days of conditions defined in I.4(v). The plan shall be implemented within 30 days of written approval by the Corps. Implementation of the plan will continue until the monthly flow-weighted conductivity falls below the levels described in paragraph (v), above, for three (3) consecutive months. If after cessation of AMP I implementation, conductivity trends defined in I.4(v) begin to rise, implementation of the AMP will be reinitiated.

5. If monthly flow-weighted conductivity values exceed the levels described in paragraph (v), above, continually for three months after implementation of AMP Phase I, the permittee shall prepare, within 30 days, recommendations for additional actions to reduce effluent conductivity (AMP Phase II). These recommendations shall be implemented within 30 days of written approval by the Corps.

II. Effluent and In-stream Chemical and Biological Monitoring

A. Effluent Monitoring

The permittee shall perform effluent monitoring from representative outfalls on Pond#1, Pond#3, Pond#15, and Pond#21, as these ponds are established. Effluent monitoring samples are to be collected at the outlet of each pond. Where the following monitoring conditions include additional monitoring parameters or monitoring events, these data shall augment, but not replace monitoring requirements in the Kentucky NPDES permit.

a. Parameters and Test Methods

i) Hydrologic permanence of outflow from the ponds should be monitored and logged by a continuously recording data logger.

ii) The permittee should perform effluent monitoring of the parameters listed in Table 1, analyzed using EPA Test Methods in 40 CFR Part 136 by an approved licensed laboratory.

b. Sampling Location

The sampling should be conducted at each representative outfall at Pond#1, Pond#3, Pond#15, and Pond#21.

c. Sampling Frequency

[4] See, supra, footnote 2.

The sampling frequency is as noted in Table 1. Samples required quarterly should be no fewer that five (5) days apart, and the amount of precipitation for the previous 24 hour period should be recorded on-site and reported (to the nearest 0.1 inch) as part of the sampling report. Samples required twice per month should be no fewer than five (5) days apart, and the amount of precipitation for the previous 48 hour period should be recorded on-site and reported (to the nearest 0.1 inch) as part of the sampling report. Monitoring will continue through final bond release.

Reporting

Reports shall contain tabulated data (including sample station I.D., date, and time) and graphs necessary to present information clearly and concisely, including all such tables and graphs necessary to summarize and present the entire period of record for each parameter and sample station. Latitude and longitude coordinates of all water quality monitoring locations with the applicable datum identified must be provided along with photographs and figures illustrating all sample locations. Calibration records of all *in-situ* multi-probe or single-probe water quality instruments and laboratory reports showing the analytical results must also be submitted.

All results should be clearly labeled with the applicable CWA permit number and KDNR DMP number and submitted KDOW, the Corps, and EPA Region 4.

Table 1. Supplemental effluent and in-stream water quality monitoring parameters.

Parameter	Units	Method	Sample Frequency
Bicarbonate Alkalinity	mg/l		Quarterly
Chlorides	mg/l	EPA300.0	Quarterly
Discharge	cfs	DOWSOP03019	Twice per month
Dissolved oxygen	mg/l	DOWSOP03014	Twice per month
Duration of discharge[1]	days		Continuous
Hardness (as $CaCO_3$)	mg/l	SM 2340B	Quarterly
pH	s.u.	DOWSOP03014	Quarterly
Precipitation	inches		Continuous
Sulfates	mg/l	EPA300.0	Quarterly
Specific conductance[2]	uS/cm	EPA120.1	Twice per month
Temperature	Deg C	DOWSOP03014	Twice per month
Turbidity	ntu	DOWSOP03014	Twice per month
Total Dissolved Solids (TDS)	mg/l	SM 2540C	Quarterly
Total Calcium	ug/l	EPA200.7	Quarterly
Total Magnesium	ug/l	EPA200.7	Quarterly
Total Potassium	ug/l		Quarterly
Total Sodium	ug/l		Quarterly
Total Recoverable Antimony	ug/l	EPA200.8	Quarterly
Total Recoverable Arsenic	ug/l	EPA200.8	Quarterly
Total Recoverable Beryllium	ug/l	EPA200.8	Quarterly
Total Recoverable Cadmium	ug/l	EPA200.8	Quarterly
Total Recoverable Chromium (III)	ug/l		
Total Recoverable Chromium (IV)	ug/l		

Total Recoverable Copper	ug/l	EPA200.8	Quarterly
Total Recoverable Iron[2]	ug/l	EPA200.8	Quarterly
Total Recoverable Lead	ug/l	EPA200.8	Quarterly
Total Recoverable Manganese[2]	ug/l	EPA200.8	Quarterly
Total Recoverable Mercury	ug/l	EPA1631E or 245.7	Quarterly
Total Recoverable Nickel	ug/l	EPA200.8	Quarterly
Total Recoverable Selenium	ug/l	EPA200.8	Quarterly
Total Recoverable Silver	ug/l	EPA200.8	Quarterly
Total Recoverable Thallium	ug/l	EPA200.8	Quarterly
Total Recoverable Zinc	ug/l	EPA200.8	Quarterly

[1] Duration of discharge from pond should be measured using a continuously recording data logger.

[2] Specific conductance, manganese, and iron need to be sampled at in-stream chemical monitoring locations only, unless otherwise stated in the applicable Kentucky NPDES permit.

B. WET Monitoring

Beginning at the initiation of discharge from representative outfalls (as specified above under "Effluent Monitoring"), EPA believes coal mine permits should require the permittee to perform either acute or chronic WET tests on the representative outfalls based on the duration of the discharge as documented by the continuously recording data loggers referenced in II.A(a)(i). The results of WET monitoring will be used to determine the effectiveness of the BMPs.

In cases where hydrologic permanence monitoring data indicate a sediment pond with any volume of discharge lasting more than 4 consecutive days, chronic WET tests should be performed using *Ceriodaphnia dubia* and *Pimephales promelas* and using a dilution series that includes 100 percent effluent and the in-stream waste concentration.[5] The end points should be reported as the inhibition concentration that affects 25% of the test organisms compared to the control (IC_{25}). Sampling should be performed quarterly. The operator should use WET testing procedures outlined in EPA's document entitled, "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (October 2002).

In cases where the effluent discharge may be short in duration, it may be necessary to collect a high volume effluent sample and properly preserve it for use in the static-renewal test. Please refer to Section 8.5.4 on page 32 of EPA's document entitled, "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (October 2002). Alternative acute WET test organisms are either *Daphnia magna* or *D. pulex* and *Pimaphales promelas*. In addition to reporting these results to the Corps, all results should be reported to EPA and KDOW.

C. In-stream Water Quality Monitoring

The permittee should perform in-stream monitoring for the parameters listed above in Table 1, in accordance with 40 CFR §122.44(d)(1)(vi)(C)(3). Sample collection and quality assurance / quality control should follow Kentucky Standard Operating Procedures at DOWSOP03014 and DOWSOP03015. EPA Test Methods in 40 CFR Part 136 should be used for analytical analysis.

a. Sample Type
Grab samples should be taken whenever possible.

b. Sampling Locations
Samples should be taken from the following locations:

[5] EPA notes that approved invertebrate WET test species are relatively insensitive to conductivity, as compared to in situ aquatic macroinvertebrates in central Appalachian streams. Nevertheless, EPA believes that WET tests can help identify significant water quality impairments as a result of surface coal mining operations, which can complement numeric conductivity measurements.

i. One sampling point located upstream of the sediment pond for each representative outfall, as specified above under "Effluent Monitoring" at paragraph II.A. If there is no upstream location, an appropriate background location within the 12-digit hydrologic unit code should be used.

ii. One in-stream monitoring site located immediately below the toe of the sediment pond for each representative outfall (i.e. ≤25 feet from outfall), as specified above under "Effluent Monitoring."

iii. One sampling point located *the further* of 200 meters (656 feet) downstream of each representative outfall or the furthest downstream location that is upstream of any tributary confluence. The sampling point should be downstream of riprap and other disturbance and located within a relatively natural and intact riparian zone where possible.

iv. One sampling point located in the receiving waterbody that is within 50 feet of the first confluence necessary to increase the stream order above that stream in which the outfall is located (e.g. if the outfall is located in a 1st order stream, this sample point should be located no greater than 50 feet downstream of the first confluence that elevates the stream order below the confluence to at least a 2nd order stream)

c. Sample Frequency

The sampling frequency is as noted in Table 1. Samples required quarterly should be no fewer that five (5) days apart, and the amount of precipitation for the previous 24 hour period should be recorded on-site and reported (to the nearest 0.1 inch) as part of the sampling report. In the event that in-stream monitoring results show in-stream specific conductivity levels above those necessary to satisfy applicable water quality standards,[6] the permittee is required to increase the monitoring frequency for all parameters to two times per month. Samples required twice per month should be no fewer than five (5) days apart, and the amount of precipitation for the previous 48 hour period should be recorded on-site and reported (to the nearest 0.1 inch) as part of the sampling report. Monitoring will continue through final bond release.

d. Conditions for Taking Samples

Samples should be collected during low- or base-flow conditions (e.g., not during, or within 48 hours after, a precipitation event exceeding 0.2 inches).

e. Reporting

Reports shall contain tabulated data (including sample station I.D., date, and time) and graphs necessary to present information clearly and concisely, including all such tables and graphs necessary to summarize and present the entire period of record for each parameter and sample station. Latitude and longitude coordinates of

[6] See, supra, footnote 2.

all water quality monitoring locations with the applicable datum identified must be provided along with photographs and figures illustrating all sample locations. Calibration records of all *in-situ* multi-probe or single-probe water quality instruments and laboratory reports showing the analytical results must also be submitted.

All results should be clearly labeled with the applicable CWA permit number and KDNR DMP number and submitted KDOW, the Corps, and EPA Region 4.

D. In-stream Biological Monitoring

The permittee should implement an annual benthic macroinvertebrate study plan using approved State protocols for benthic macroinvertebrate sampling.

a. Concurrent in-stream monitoring
In-stream samples for specific conductivity, TDS, pH, temperature and dissolved oxygen should be measured at the same locations as the benthic samples using properly calibrated instruments.

b. Methods
The permittee should implement an annual benthic macroinvertebrate study plan using approved state-protocols for benthic macroinvertebrate sampling.

c. Sampling Locations
Use the same locations as shown above for in-stream water quality monitoring.

d. Sampling Frequency
Sampling times will occur consistent with accepted Kentucky protocols (i.e. sample index periods). Sampling will occur annually through final bond release. Sampling should be avoided during periods of excessive precipitation and scouring floods. In cases where a large flow rate of the receiving water does not lend itself to a benthic assessment (i.e., non-wadeable sites), the permittee should perform a bioassessment using fish. Both fish and benthic macroinvertebrate studies should be performed for receiving waterbodies that are conducive to fish assessments. Results from sampling either of the two assemblages may be used to determine if the water body is impaired.

e. Reporting
The permittee should submit the results of the study, including summary tables, appropriate indices of biotic integrity, color photographs and figures showing sample locations, calibration records, etc. to the KDOW, the Corps, and EPA no later than 30 days following the permittee's receipt of the final report.

Enclosure 2
Adaptive Management Plan Implementation Timeline

Phase	Action	Time allowed	Elapsed time since initial discharge of fill material into waters of the U.S.
Pre-AMP	Initial land clearing, excavation, hollow fill construction, and water quality monitoring	6 months	6 months
	Initial post-construction monitoring	3 to 12 months	Up to 18 months
AMP Phase I (if applicable)	Submit AMP I	30 days after AMP I trigger (SC I.4(v))	Up to 19 months
	Approve AMP I	Not specified in Special Condition, estimate 30 days	Up to 20 months
	Implement AMP I	30 days after AMP I Approval	Up to 21 months
	Monitor AMP I	3 to 6 months	Up to 27 months
AMP Phase II (if applicable)	Develop and submit AMP II	30 days after AMP II trigger (SC I.5)	Up to 28 months
	Approve AMP II	Not specified in Special Condition, estimate 30 days	Up to 29 months
	Implement AMP II	30 days after AMP II approval	Up to 30 months
	Monitor AMP II	6 months	Up to 36 months
Additional Mitigation Required (if applicable)	Submit mitigation plan	45 days after end of AMP II	Up to 37.5 months
	Approve mitigation plan	Not specified in Special Condition, estimate 30 days	Up to 38.5 months
	Implement mitigation plan	30 days after mitigation plan approval	Up to 39.5 months